

**CPC****COOPERATIVE PATENT CLASSIFICATION****E02F****DREDGING; SOIL-SHIFTING** (winning peat [E21C 49/00](#))**NOTE**

This subclass covers :

- primarily equipment for excavating or loosening earth or for moving loose earth;
- equipment for working similarly on other materials and similar equipment for loading or unloading materials

**WARNING**

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[E02F 3/32](#) covered by [E02F 3/30](#), [E02F 3/425](#)  
[E02F 3/39](#) covered by [E02F 3/286](#), [E02F 3/30K](#), [E02F 3/34K](#)  
[E02F 3/78](#) " " [E02F 7/76](#) + s.gr.  
[E02F 3/85](#) " " [E02F 3/84A](#), [E02F 3/842](#), [E02F 3/84B](#),  
[E02F 3/845](#), [E02F 3/847](#)  
[E02F 5/04](#) " " [E21B](#)  
[E02F 5/06](#) " " [E02F 3/08](#)  
[E02F 5/08](#) " " [E02F 3/18](#)  
[E02F 5/16](#) " " [E21B](#)  
[E02F 5/18](#) " " [E21B](#)  
[E02F 5/20](#) " " [E21B](#)

**E02F 1/00**

**General working methods with dredgers or soil-shifting machines** (methods for making embankments [E02D 17/18](#); methods for mining [E21C](#))

**E02F 3/00**

**Dredgers; Soil-shifting machines** (for special purposes [E02F 5/00](#); other machines or apparatus for mining [E21C](#); tunnelling [E21D](#))

## E02F 3/02

- . hand-operated; { handheld soil shifting equipment acting by sucking [E02F 3/8891](#)(spades or rakes for agriculture or gardening purposes [A01B](#))}

## E02F 3/04

- . mechanically-driven

## E02F 3/045

- .. {with oscillating digging tools, e.g. oscillating spades}

## E02F 3/06

- .. with digging screws {(earth drilling [E21](#); for digging trenches or ditches [E02F 5/04](#))}

## E02F 3/08

- .. with digging elements on an endless chain, { e.g. bucket-type chains (for digging trenches or ditches [E02F 5/06](#); cutting machines for mining or quarrying [E21C 25/22](#))}

## E02F 3/081

- ... {mounted on floating substructures (floating substructures per se [E02F 9/06](#))}

## E02F 3/082

- ... { including a belt-type conveyer for transporting the excavated material}

## E02F 3/083

- ... { including a screw-type conveyer for transporting the excavated material}

## E02F 3/085

- ... { with auxiliary or additional digging elements other than digging elements on an

		endless chain}
E02F 3/086	...	{ vertically shiftable relative to the frame}
E02F 3/087	...	{ with digging unit working in a plane inclined to the direction of travel}
E02F 3/088	...	{ pivotable relative to the frame}
E02F 3/10	...	with tools that only loosen the material, {i.e. with cutter-type chains}
E02F 3/12	...	Component parts {e.g. bucket troughs}
E02F 3/14	.....	Buckets; Chains; Guides for buckets or chains; Drives for chains {not used, see subgroups}
E02F 3/141	.....	{buckets}
E02F 3/142	.....	{tools mounted on buckets or chains which loosen the soil, e.g. cutting wheels, or the like (teeth per se <a href="#">E02F 9/28</a> )}
E02F 3/143	.....	{ chains; chain links; scraper chains (chains or chain guides <a href="#">E21C 25/28</a> )}
E02F 3/144	.....	{emptying or cleaning the buckets, e.g. in combination with spoil removing equipment}
E02F 3/145	.....	{drives}
E02F 3/146	.....	{ guides for chains or buckets, e.g. for buckets movable relative to chains (chains or chain guides <a href="#">E21C 25/28</a> )}
E02F 3/147	.....	{arrangements for the co-operation between buckets or buckets and wheels}
E02F 3/148	.....	{wheels, sprokets}
E02F 3/16	....	Safety or control devices (safety devices in general <a href="#">F16P</a> ; controlling in general <a href="#">G05</a> )
E02F 3/18	..	with digging wheels turning round an axis, { e.g. bucket-type wheels (for digging trenches <a href="#">E02F 5/08</a> ; for laying cables underwater <a href="#">E02F 5/109</a> ; cutting machines <a href="#">E21C25</a> ; methods or apparatus for making tunnels or galleries <a href="#">E21D9</a> )}
E02F 3/181	...	{ including a conveyer}
E02F 3/183	...	{ with digging unit shiftable relative to the frame}
E02F 3/185	...	{ with digging unit mounted in a plane which is inclined to the direction of travel; with tools digging laterally with respect to the frame}
E02F 3/186	...	{ with the axis being substantially parallel to the direction of travel}
E02F 3/188	...	{ with the axis being horizontal and transverse to the direction of travel}
E02F 3/20	...	with tools that only loosen the material, {i.e. mill-type wheels}
E02F 3/205	.....	{ with a pair of digging wheels, e.g. slotting machines (implements for making foundation slots with definition of the walls or foundations <a href="#">E02D 17/13</a> ; bulkheads or similar walls made solely of concrete in situ <a href="#">E02D 5/18</a> ; with a pair of buckets <a href="#">E02F 3/475</a> )}
E02F 3/22	...	Component parts
E02F 3/24	.....	Digging wheels; Digging elements of wheels; Drives for wheels
E02F 3/241	.....	{digging wheels}
E02F 3/243	.....	{wheels rotatable in both directions}
E02F 3/245	.....	{with digging elements mounted movable relative to the wheel}
E02F 3/246	.....	{drives}
E02F 3/248	.....	{ Cleaning the wheels or emptying the digging elements mounted on the wheels, e.g. in combination with spoil removing equipment}
E02F 3/26	....	Safety or control devices (safety devices in general <a href="#">F16P</a> ; controlling in general <a href="#">G05B</a> )

- E02F 3/28 .. with digging tools mounted on a dipper- or bucket-arm, {i.e. there is either one arm or a pair of arms}, e.g. dippers, buckets
- E02F 3/283 ... { with a single arm pivoted directly on the chassis ([linkage mechanism for it E02F 3/3405](#))}
- E02F 3/286 ..... { telescopic or slidable ([fork-lift trucks with a telescopic boom B66F 9/0655](#))}
- E02F 3/30 ... with a dipper-arm pivoted on a cantilever beam, {i.e. boom}
- E02F 3/301 ..... { with more than two arms ([boom included](#)), e.g. two-part boom with additional dipper-arm}
- E02F 3/302 ..... {with an additional link}
- E02F 3/303 ..... { with the dipper-arm or boom rotatable about its longitudinal axis}
- E02F 3/304 ..... { with the dipper-arm slidably mounted on the boom ([E02F 3/305 takes precedence](#))}
- E02F 3/305 ..... {with the dipper-arm slidably mounted on the boom and the boom slidably mounted on the frame}
- E02F 3/306 ..... { with telescopic dipper-arm or boom}
- E02F 3/307 ..... {the boom and the dipper-arm being connected so as to permit relative movement in more than one plane}
- E02F 3/308 ..... { working outwardly}
- E02F 3/32 ..... working downwardly and towards the machine, e.g. with backhoes
- E02F 3/325 ..... { Backhoes of the miniature type}
- E02F 3/34 ... with bucket-arms { i.e. a pair of arms, e.g. manufacturing processes, form, geometry, material of bucket-arms ([with a single arm E02F 3/283](#))} directly pivoted on the frames of tractors or self-propelled machines
- E02F 3/3402 ..... { the arms being telescopic ([fork-lift trucks with a telescopic boom B66F 9/0655](#))}
- E02F 3/3405 ..... {and comprising an additional linkage mechanism}
- E02F 3/3408 ..... {of the parallelogram-type}
- E02F 3/3411 ..... {of the Z-type}
- E02F 3/3414 ..... { the arms being pivoted at the rear of the vehicle chassis, e.g. skid steer loader}
- E02F 3/3417 ..... {Buckets emptying by tilting ([E02F 3/342](#), [E02F 3/345 take precedence](#))}
- E02F 3/342 ..... Buckets emptying overhead ([E02F 3/348 to E02F 3/358 take precedence](#))
- E02F 3/345 ..... Buckets emptying side-ways ([E02F 3/348 to E02F 3/358 take precedence](#))
- E02F 3/348 ..... Buckets emptying into a collecting or conveying device
- E02F 3/3483 ..... {Buckets discharging on a conveyer or elevator mounted on the machine}
- E02F 3/3486 ..... {Buckets discharging overhead into a container mounted on the machine}
- E02F 3/352 ..... Buckets movable along a fixed guide
- E02F 3/355 ..... Buckets connected to the rear end of a tractor {not used}
- E02F 3/358 ..... Bucket-arms pivoted on a turntable being part of a tractor frame {or buckets arranged on a turntable supported by the arms}
- E02F 3/36 ... Component parts
- E02F 3/3604 ..... { Devices to connect tools to arms, booms or the like}
- E02F 3/3609 ..... { of the quick acting type, e.g. controlled from the operator seat ([quick-acting couplers to connect booms or arms to tractors E02F 3/627](#); [quick-acting couplers for machines mounted on tractor A01B 59/06](#); [couplings of the quick-acting type per se F16L37](#))}

E02F 3/3613	.....	{ with means for absorbing any play therebetween ( <a href="#">E02F 3/364</a> takes precedence)}
E02F 3/3618	.....	{ with two separating hooks}
E02F 3/3622	.....	{ with a hook and a locking element acting on a pin}
E02F 3/3627	.....	{ with a hook and a longitudinal locking element}
E02F 3/3631	.....	{ with a hook and a transversal locking element}
E02F 3/3636	.....	{ using two or four movable transversal pins}
E02F 3/364	.....	{ using wedges}
E02F 3/3645	.....	{ with auto-engagement means for automatic snap-on of the tool coupler part}
E02F 3/365	.....	{ with redundant latching means, e.g. for safety purposes}
E02F 3/3654	.....	{ with energy coupler, e.g. coupler for hydraulic or electric lines, to provide energy to drive(s) mounted on the tool}
E02F 3/3659	.....	{ electrically-operated}
E02F 3/3663	.....	{ hydraulically-operated}
E02F 3/3668	.....	{ where engagement is effected by a mechanical lever or handle}
E02F 3/3672	.....	{ where disengagement is effected by a mechanical lever or handle}
E02F 3/3677	.....	{ allowing movement, e.g. rotation or translation, of the tool around or along another axis as the movement implied by the boom or arms, e.g. for tilting buckets}
E02F 3/3681	.....	{ Rotators}
E02F 3/3686	.....	{ using adapters, i.e. additional element to mount between the coupler and the tool}
E02F 3/369	....	{ Devices to connect parts of a boom or an arm ( <a href="#">devices to connect booms or arms to tractors E02F 3/627</a> )}
E02F 3/3695	....	{ Arrangements for connecting dipper-arms to loaders or graders}
E02F 3/38	....	Cantilever beams { i.e. booms; e.g. manufacturing processes, forms, geometry or materials used for booms ( <a href="#">for booms with cable suspension arrangements E02F 9/14</a> takes precedence)}; Dipper-arms { e.g. manufacturing processes, forms, geometry or materials used for dipper-arms}; Bucket-arms {( <a href="#">E02F 3/34</a> takes precedence)}
E02F 3/382	.....	{ Connections to the frame; Supports for booms or arms ( <a href="#">devices to connect booms or arms to tractors or similar machines E02F 3/627</a> ; <a href="#">pivot joint assemblies in particular E02F 9/006</a> )}
E02F 3/384	.....	{the boom being pivotable relative to the frame about a vertical axis}
E02F 3/386	.....	{the boom being laterally shiftable relative to the frame}
E02F 3/388	.....	{ Mechanical locking means for booms or arms against rotation, e.g. during transport of the machine ( <a href="#">transporting-cranes B66C 23/344</a> )}
E02F 3/40	....	Dippers; Buckets { Grab device, e.g. manufacturing processes for buckets, form, geometry, material of buckets ( <a href="#">devices to connect tools to arms or booms E02F 3/3604</a> ; <a href="#">teeth therefor E02F 9/28</a> )}
E02F 3/401	.....	{Buckets or forks comprising, for example, shock absorbers, supports or load striking scrapers to prevent overload}
E02F 3/402	.....	{with means for facilitating the loading thereof, e.g. conveyers}
E02F 3/404	.....	{comprising two parts movable relative to each other, e.g. for gripping}
E02F 3/405	.....	{using vibrating means ( <a href="#">blades or levelling tools with vibrating teeth E02F 3/8155</a> ; <a href="#">vibrating rippers E02F 5/326</a> )}

E02F 3/407	.....	with ejecting {or other unloading} device
E02F 3/4075	.....	{Dump doors; Control thereof}
E02F 3/413	.....	with grabbing device ({E02F 3/404 takes precedence; with grab buckets moved by cables or hoisting ropes E02F 3/47;} grab equipment for cranes B66C)
E02F 3/4131	.....	{mounted on a floating substructure (floating substructures per se E02F 9/06)}
E02F 3/4133	.....	{grabs carried out as loaders or mounted on a tractor}
E02F 3/4135	.....	{with grabs mounted directly on a boom}
E02F 3/4136	.....	{ with grabs mounted on a slidable or telescopic boom or arm}
E02F 3/4138	.....	{the grab being emptied by flushing}
E02F 3/42	....	Drives for dippers, buckets, dipper-arms or bucket-arms
E02F 3/422	.....	{Drive systems for bucket-arms, front-end loaders, dumpers or the like}
E02F 3/425	.....	{Drive systems for dipper-arms, backhoes or the like}
E02F 3/427	.....	{ with mechanical drives (by cables or hoisting ropes E02F 3/46 take precedence)}
E02F 3/43	.....	Control of dipper or bucket position; Control of sequence of drive operations
E02F 3/431	.....	{for bucket-arms, front-end loaders, dumpers or the like}
E02F 3/432	.....	{for keeping the bucket in a predetermined position or attitude}
E02F 3/433	.....	{horizontal, e.g. self-levelling}
E02F 3/434	.....	{providing automatic sequences of movements, e.g. automatic dumping or loading, automatic return-to-dig}
E02F 3/435	.....	{for dipper-arms, backhoes or the like}
E02F 3/436	.....	{for keeping the dipper in the horizontal position, e.g. self-levelling}
E02F 3/437	.....	{providing automatic sequences of movements, e.g. linear excavation, keeping dipper angle constant}
E02F 3/438	.....	{Memorising movements for repetition, e.g. play-back capability}
E02F 3/439	.....	{Automatic repositioning of the implement, e.g. automatic dumping, auto-return (E02F 3/438 takes precedence)}
E02F 3/46	..	with reciprocating digging or scraping elements moved by cables or hoisting ropes; { Drives or control devices therefor (E02F 3/205, E02F 3/905 take precedence)}
E02F 3/47	...	with grab buckets (grab equipment for cranes B66C)
E02F 3/475	.....	{ for making foundation slots (slotting machines with a pair of digging wheels E02F 3/205)}
E02F 3/48	...	Drag-lines
E02F 3/50	...	with buckets or other digging elements moved along a rigid guideway
E02F 3/52	...	Cableway excavators (cable cranes B66C)
E02F 3/54	...	Cable scrapers {(E02F 3/48, E02F 3/52 take precedence)}
E02F 3/56	.....	with hand-controlled scraper or other digging elements
E02F 3/58	...	Component parts {(E02F 9/14, E02F 3/905 take precedence)}
E02F 3/60	.....	Buckets, scrapers, or other digging elements
E02F 3/627	..	Devices to connect beams or arms to tractors or similar self-propelled machines, { e.g. drives therefor (Connection of beams or booms or arms to the frame per se E02F 3/382; connection of scraper bowls to the vehicle main body E02F 3/653; connecting devices for agriculture tractors A01B 59/06)}

- E02F 3/6273 ... {using legs to support the beams or arms on the ground during the connecting process}
- E02F 3/6276 ... { on one side of the frame}
- E02F 3/633 ... Drives therefor {(not used, see [E02F 3/627](#))}
- E02F 3/64 .. Buckets cars, i.e. having scraper bowls {(for cable scrapers [E02F 3/54](#) takes precedence; soil working machines in agriculture A01B)}
- E02F 3/6409 ... { Self-propelled scrapers}
- E02F 3/6418 ..... { with rotatable scraper bowls for dumping the soil (with only elements of the scraper bowls being pivotable [E02F 3/6427](#))}
- E02F 3/6427 ..... { with elements of the scraper bowls being pivotable for dumping the soil ([E02F 3/6445](#) take precedence; with an ejector having translational movement [E02F 3/6436](#))}
- E02F 3/6436 ..... { with scraper bowls with an ejector having translational movement for dumping the soil ([E02F 3/6445](#) takes precedence)}
- E02F 3/6445 ..... { with conveying means for emptying the scraper bowl}
- E02F 3/6454 ... { Towed (i.e. pulled or pushed) scrapers}
- E02F 3/6463 ..... { with rotatable scraper bowls for dumping the soil (with only elements of the scraper bowls being pivotable [E02F 3/6472](#))}
- E02F 3/6472 ..... { with elements of the scraper bowls being pivotable for dumping the soil ([E02F 3/649](#) takes precedence; with an ejector having translational movement [E02F 3/6481](#))}
- E02F 3/6481 ..... { with scraper bowls with an ejector having translational movement for dumping the soil ([E02F 3/649](#) takes precedence)}
- E02F 3/649 ..... { with conveying means for emptying the scraper bowl}
- E02F 3/65 ... Component parts, e.g. drives, control devices
- E02F 3/651 ..... { Hydraulic or pneumatic drives; Electric or electro-mechanical control devices ([E02F 3/652](#), [E02F 3/653](#) take precedence)}
- E02F 3/652 ..... { Means to adjust the height of the scraper bowls, e.g. suspension means, tilt control, earth damping control}
- E02F 3/653 ..... { Connection mechanisms to the main body of the machine (connection of tools to dipper-arms, booms, bucket-arms [E02F 3/3604](#); connection of beams or booms or arms to tractors in general [E02F 3/627](#))}
- E02F 3/654 ..... { Scraper bowls and components mounted on them}
- E02F 3/655 ..... { Loading or elevator mechanisms (Loading devices for excavators in general [E02F 7/04](#))}
- E02F 3/656 ..... { Ejector or dumping mechanisms (for buckets mounted on a dipper-arm or bucket arms [E02F 3/407](#))}
- E02F 3/657 ..... { Means to prevent the spilling of dredged material, e.g. apron, baffle}
- E02F 3/658 ..... { Cutting edge (for graders or bulldozer blades [E02F 3/8152](#), [E02F 3/8155](#); teeth per se [E02F 9/28](#))}
- E02F 3/659 ..... { Conveying means for emptying scraper bowls (conveying equipment for excavators in general [E02F 7/02](#))}
- E02F 3/76 .. Graders, bulldozers, or the like with scraper plates or ploughshare-like elements (soil-working A01B); Levelling { scarifying} devices {(street cleaning E01H; construction of roads E01C19, E01C23)}
- E02F 3/7604 ... {Combinations of scraper blades with soil loosening tools working independently of scraper blades (soil loosening attachments fixed on blades [E02F 3/8152](#), [E02F 3/8155](#))}

E02F 3/7609	...	{Scraper blade mounted forwardly of the tractor on a pair of pivoting arms which are linked to the sides of the tractor, e.g. bulldozers}
E02F 3/7613	.....	{with the scraper blade adjustable relative to the pivoting arms about a vertical axis, e.g. angle dozers}
E02F 3/7618	.....	{with the scraper blade adjustable relative to the pivoting arms about a horizontal axis}
E02F 3/7622	...	{Scraper equipment with the scraper blade mounted on a frame to be hitched to the tractor by bars, arms, chains or the like, the frame having no ground supporting means of its own, e.g. drag scrapers}
E02F 3/7627	.....	{with the scraper blade adjustable relative to the frame about a vertical axis}
E02F 3/7631	.....	{with the scraper blade adjustable relative to the frame about a horizontal axis}
E02F 3/7636	...	{Graders with the scraper blade mounted under the tractor chassis}
E02F 3/764	.....	{with the scraper blade being pivotable about a vertical axis}
E02F 3/7645	.....	{with the scraper blade being pivotable about a horizontal axis disposed parallel to the blade}
E02F 3/765	.....	{with the scraper blade being pivotable about a horizontal axis disposed perpendicular to the blade}
E02F 3/7654	.....	{with the scraper blade being horizontally movable into a position near the chassis}
E02F 3/7659	.....	{with the vertical centre-line of the scraper blade disposed laterally relative to the central axis of the chassis}
E02F 3/7663	...	{Graders with the scraper blade mounted under a frame supported by wheels, or the like}
E02F 3/7668	.....	{with the scraper blade being pivotable about a vertical axis}
E02F 3/7672	.....	{with the scraper blade being pivotable about a horizontal axis disposed parallel to the blade}
E02F 3/7677	.....	{with the scraper blade being pivotable about a horizontal axis disposed perpendicular to the blade}
E02F 3/7681	.....	{with the scraper blade being horizontally movable into a position near the frame}
E02F 3/7686	.....	{with the vertical centre-line of the scraper blade disposed laterally relative to the central axis of the frame}
E02F 3/769	...	{Graders, bulldozers, or the like comprising loaders}
E02F 3/7695	...	{ Graders, bulldozers or the like comprising elevators or conveyers}
E02F 3/78	...	with rotating digging elements
E02F 3/783	.....	{ having a horizontal axis of rotation}
E02F 3/786	.....	{ having a vertical axis of rotation}
E02F 3/80	...	Component parts
E02F 3/815	.....	Blades; Levelling{or scarifying}tools{(E02F 3/40 takes precedence)}
E02F 3/8152	.....	{ Attachments therefor, e.g. wear resisting parts, cutting edges (E02F 3/8155, E02F 3/8157 take precedence; teeth per se E02F 9/28)}
E02F 3/8155	.....	{provided with movable parts, e.g. cutting discs, vibrating teeth or the like}
E02F 3/8157	.....	{Shock absorbers; Supports, e.g. skids, rollers; Devices for compensating wear-and-tear, or the like}
E02F 3/84	.....	Drives or control devices therefor, { e.g. hydraulic drive systems}
E02F 3/841	.....	{ Devices for controlling and guiding the whole machine, e.g. by feeler

		elements and reference lines placed exteriorly of the machine (construction of roads <a href="#">E01C 19/008</a> )
E02F 3/842	.....	{using electromagnetic, optical or photoelectric beams, e.g. laser beams}
E02F 3/844	.....	{for positioning the blade, e.g. hydraulically}
E02F 3/845	.....	{using mechanical sensors to determine the blade position, e.g. inclinometers, gyroscopes, pendulums}
E02F 3/847	.....	{using electromagnetic, optical or acoustic beams to determine the blade position, e.g. laser beams}
E02F 3/848	.....	{using cable drums}
E02F 3/88	..	with arrangements acting by a sucking or forcing effect, e.g. suction dredgers (pumps in general <a href="#">F04</a> )
E02F 3/8808	...	{ Stationary installations, e.g. installations using spuds or other stationary supports (spuds on floating substructures per se <a href="#">E02F 9/062</a> ; cleaning the beds of waterways <a href="#">E02B 3/02</a> )}
E02F 3/8816	...	{Mobile land installations}
E02F 3/8825	.....	{wherein at least a part of the soil-shifting equipment is mounted on a dipper-arm, backhoes or the like}
E02F 3/8833	...	{ Floating installations (floating substructures per se <a href="#">E02F 9/06</a> )}
E02F 3/8841	.....	{wherein at least a part of the soil-shifting equipment is mounted on a ladder or boom}
E02F 3/885	.....	{self propelled, e.g. ship}
E02F 3/8858	...	{Submerged units (self propelled units for burying conduits or cables in trenches under water <a href="#">E02F 5/105</a> )}
E02F 3/8866	.....	{self propelled}
E02F 3/8875	.....	{pulled or pushed}
E02F 3/8883	...	{Using the force of explosions, e.g. by the use of internal combustion engines}
E02F 3/8891	...	{wherein at least a part of the soil-shifting equipment is handheld}
E02F 3/90	...	Component parts {e.g. arrangement or adaptation of pumps}
E02F 3/902	.....	{ for modifying the concentration of the dredged material, e.g. relief valves preventing the clogging of the suction pipe}
E02F 3/905	.....	{ Manipulating or supporting suction pipes or ladders; Mechanical supports or floaters therefor; pipe joints for suction pipes (for heave compensation <a href="#">E02F 9/067</a> takes precedence; pipelines per se <a href="#">E02F 7/10</a> ; joints for pipes in general <a href="#">F16L</a> )}
E02F 3/907	.....	{ Measuring or control devices, e.g. control units, detection means or sensors ( <a href="#">E02F 3/902</a> takes precedence)}
E02F 3/92	.....	Digging elements, e.g. suction heads
E02F 3/9206	.....	{ Digging devices using blowing effect only, like jets or propellers ( <a href="#">E02F 5/107</a> takes precedence; passive suction heads with jets <a href="#">E02F 3/925</a> ; active suction heads with jets <a href="#">E02F 3/9262</a> ; drilling by jets <a href="#">E21B 7/18</a> ; slitting by jets <a href="#">E21C 25/60</a> )}
E02F 3/9212	.....	{ Mechanical digging means, e.g. suction wheels, i.e. wheel with a suction inlet attached behind the wheel ( <a href="#">E02F 3/9287</a> takes precedence; Active suction heads <a href="#">E02F 3/9256</a> )}
E02F 3/9218	.....	{ with jets}
E02F 3/9225	.....	{ with rotating cutting elements}
E02F 3/9231	.....	{ Suction wheels with axis of rotation parallel to longitudinal axis of

- the suction pipe}
- E02F 3/9237 ..... { Suction wheels with axis of rotation in transverse direction of the longitudinal axis of the suction pipe}
- E02F 3/9243 ..... { Passive suction heads with no mechanical cutting means ([E02F 5/108](#) takes precedence)}
- E02F 3/925 ..... {with jets}
- E02F 3/9256 ..... { Active suction heads; Suction heads with cutting elements, i.e. the cutting elements are mounted within the housing of the suction head ([E02F 5/108](#) takes precedence)}
- E02F 3/9262 ..... {with jets}
- E02F 3/9268 ..... {with rotating cutting elements}
- E02F 3/9275 ..... {with axis of rotation parallel to longitudinal axis of the suction pipe}
- E02F 3/9281 ..... {with axis of rotation in horizontal and transverse direction of the suction pipe}
- E02F 3/9287 ..... {Vibrating suction heads}
- E02F 3/9293 ..... {Component parts of suction heads, e.g. edges, strainers for preventing the entry of stones or the like}
- E02F 3/94 ..... Apparatus for separating stones from the dredged material, {i.e. separating or treating dredged material ([screening plants mounted on dredger therefor E02F 7/06](#))}
- E02F 3/945 ..... {for environmental purposes}
- E02F 3/96 .. with arrangements for alternate { or simultaneous} use of different digging elements {([E02F 3/7604](#), [E02F 3/769](#), [E02F 3/78](#) take precedence; quick-acting devices to connect tools to arms or booms [E02F 3/3609](#), for arms to tractors or the like [E02F 3/627](#))}
- E02F 3/961 ... { with several digging elements or tools mounted on one machine ([for backhoes E02F 3/964](#) takes precedence)}
- E02F 3/962 ... {Mounting of implements directly on tools already attached to the machine ([E02F 3/404](#) and [E02F 3/8152](#) take precedence)}
- E02F 3/963 ... { Arrangements on backhoes for alternate use of different tools ([backhoes per se E02F 3/30](#); quick-acting devices to connect tools to arms [E02F 3/3609](#), for arms to tractors or the like [E02F 3/627](#))}
- E02F 3/964 ..... { of several tools mounted on one machine ([E02F 3/962](#) takes precedence)}
- E02F 3/965 ... { of metal-cutting or concrete-crushing implements ([shearing devices B23D 17/00](#); wrecking of buildings, e.g. tools therefor, [E04F 23/08](#))}
- E02F 3/966 ... { of hammer-type tools ([arrangements for breaking-up hard ground E02F 5/305](#); percussion -type rippers [E02F 5/323](#))}
- E02F 3/967 ... { of compacting-type tools ([compacting tools in combination with special-purpose dredges or soil-shifting machines E02F 5/30](#))}
- E02F 3/968 ... {Storing, handling or otherwise manipulating tools when detached from the machine ([E02F 3/6273](#) takes precedence)}

## **E02F 5/00 Dredgers or soil-shifting machines for special purposes**

- E02F 5/003 . {for uncovering conduits}
- E02F 5/006 . { adapted for working ground under water not otherwise provided for ([E02F 3/081](#), [E02F 3/4131](#), [E02F 3/8833](#), [E02F 5/104](#), [E02F 5/125](#), [E02F 7/005](#), [E02F 7/023](#), [E02F 7/065](#), [E02F 9/026](#), [E02F 9/045](#), [E02F 9/06](#) take precedence)}

- E02F 5/02 . for digging trenches or ditches ({ machines for making foundation slots [E02F 3/205](#), [E02F 3/475](#) take precedence); agricultural ploughs for working ridges [A01B 13/02](#))
- E02F 5/022 .. {with tools digging laterally with respect to the frame}
- E02F 5/025 .. {with scraper-buckets, dippers or shovels}
- E02F 5/027 .. { with coulters, ploughs, scraper plates, or the like ([E02F 5/102](#), [E02F 5/103](#), [E02F 5/106](#) take precedence)}
- E02F 5/04 .. with digging screws {([E02F 5/109](#) takes precedence; with digging screws per se [E02F 3/06](#))}
- E02F 5/06 .. with digging elements mounted on an endless chain {([E02F 5/109](#) takes precedence; with digging elements mounted on an endless chain per se [E02F 3/08](#))}
- E02F 5/08 .. with digging wheels turning round an axis {([E02F 5/109](#) takes precedence; with digging wheels per se [E02F 3/18](#))}
- E02F 5/10 .. with arrangements for reinforcing trenches or ditches; with arrangements for making or assembling conduits or for laying conduits or cables (laying pipes per se [F16L 1/00](#), making pipes in situ [F16L 1/038](#); laying electric cables per se [H02G 1/06](#); { drainage device- laying apparatus [E02B 11/02](#))}
- E02F 5/101 ... {forming during digging, e.g. underground canalisations or conduits, by bending or twisting a strip of pliable material; by extrusion}
- E02F 5/102 ... {operatively associated with mole-ploughs, coulters (rippers [E02F 5/32](#))}
- E02F 5/103 .... {with oscillating or vibrating digging tools}
- E02F 5/104 ... {for burying conduits or cables in trenches under water (floating substructures per se [E02F 9/06](#))}
- E02F 5/105 .... {self-propulsed units moving on the underwater bottom}
- E02F 5/106 .... { using ploughs, coulters, rippers}
- E02F 5/107 .... { using blowing-effect devices, e.g. jets (digging devices using a blowing effect per se [E02F 3/9206](#))}
- E02F 5/108 .... { using suction-effect devices (suction heads per se [E02F 3/9243](#), [E02F 3/9256](#))}
- E02F 5/109 .... { using rotating digging elements (rotating digging elements per se [E02F 3/18](#))}
- E02F 5/12 .. with equipment for back-filling trenches or ditches
- E02F 5/125 ... {underwater}
- E02F 5/14 .. Component parts for trench excavators, e.g. indicating devices {travelling gear chassis, supports, skids}
- E02F 5/145 ... {control and indicating devices}
- E02F 5/16 . Machines for digging other holes in the soil (earth drilling [E21](#))
- E02F 5/18 .. for horizontal holes { or inclined holes}
- E02F 5/20 .. for vertical holes
- E02F 5/22 . for making embankments; for back-filling (in combination with trench excavators [E02F 5/12](#))
- E02F 5/223 .. {for back-filling (in association with trench excavators [E02F 5/12](#))}
- E02F 5/226 ... {with means for processing the soil, e.g. screening belts, separators; Padding machines}
- E02F 5/24 .. Depositing dredged material in mounds

- E02F 5/26 . . Combined conveying-bridges and dredgers
- E02F 5/28 . for cleaning watercourses or other ways {(stream regulation [E02B 3/02](#))}
- E02F 5/282 . . {with rotating cutting or digging tools}
- E02F 5/285 . . {with drag buckets or scraper plates}
- E02F 5/287 . . { with jet nozzles (digging devices with blowing effect per se [E02F 3/9206](#))}
- E02F 5/30 . Auxiliary apparatus, e.g. for tawing, craking, blowing-up, or other preparatory treatment of the soil
- E02F 5/305 . . { Arrangements for breaking-up hard ground ([E02F 5/32](#) takes precedence; hammer-type tools [E02F 3/966](#); breaking-up paving of roads or the like [E01C 23/12](#); breaking-up subaqueous rock [E02B 3/02](#))}
- E02F 5/32 . . Rippers {([E02F 5/106](#) takes precedence, ripper or scarifying teeth mounted on blades [E02F 3/8152](#); ripper tips [E02F 9/2875](#))}
- E02F 5/323 . . . {Percussion-type rippers}
- E02F 5/326 . . . {oscillating or vibrating}
  
- E02F 7/00** **Equipment for conveying or separating excavated material (barges adapted for carrying-away material from floating dredgers [B63B 35/28](#))**
- E02F 7/005 . {conveying material from the underwater bottom (by pipelines [E02F 7/10](#); suction dredgers [E02F 3/88](#))}
- E02F 7/02 . Conveying equipment mounted on dredgers or excavators (conveyers in general [B65G](#)){(in combination with graders or bulldozers [E02F 3/7695](#); in combination with rotating digging wheels [E02F 3/181](#); in combination with bucket-arms [E02F 3/348](#); in combination with digging elements mounted on an endless chain [E02F 3/082](#), [E02F 3/083](#))}
- E02F 7/023 . . {mounted on a floating dredger}
- E02F 7/026 . . {mounted on machines equipped with dipper- or bucket-arms}
- E02F 7/04 . Loading devices mounted on a dredger or an excavator (loading devices in general [B65G](#)){hopper dredgers, also equipment for unloading the hopper}
- E02F 7/06 . Delivery chutes or screening plants { or mixing plants} mounted on dredgers or excavators ({ for back-filling [E02F 5/226](#) takes precedence); separating equipment in general [B03](#); delivery chutes in general [B65G](#))
- E02F 7/065 . . {mounted on a floating dredger}
- E02F 7/10 . Pipelines for conveying excavated materials (pipes in general [F16L](#); pipe-lines systems [F17D](#)){conveying by liquid pressure [B65G 53/30](#)}
  
- E02F 9/00** **Component parts of dredgers or soil-shifting machines, not restricted to one of the kinds covered by groups [E02F 3/00](#) to [E02F 7/00](#)(laying-out or take-up devices for trailing electric cables [B66C](#))**
- E02F 9/003 . {Devices for transporting the soil-shifting machines or excavators, e.g. by pushing them or by hitching them to a tractor}
- E02F 9/006 . {Pivot joint assemblies (in general [F16C 11/04](#))}

- E02F 9/02 . Travelling-gear, e.g. associated with slewing gears [\(drives therefor E02F 9/20\)](#); for motor vehicles [B60B](#), G; undercarriages for locomotives or rail-road cars [B61F](#); track-laying vehicles [B62D](#); for cranes [B66C 23/18](#))
- E02F 9/022 .. {for moving on rails}
- E02F 9/024 .. {with laterally or vertically adjustable wheels or tracks (for vehicles in general [B60B 35/10](#); [B62D 55/084](#))}
- E02F 9/026 .. {for moving on the underwater bottom (marine propulsion by direct engagement with water-bed or ground [B63H 19/08](#))}
- E02F 9/028 .. {with arrangements for levelling the machine (hydraulic drives therefor [E02F 9/2257](#))}
- E02F 9/04 .. Walking gears moving the dredger forward step-by-step
- E02F 9/045 ... [for moving on the underwater bottom (for artificial islands [E02B 17/022](#); marine propulsion by direct engagement with water-bed or ground [B63H 19/08](#))]
- E02F 9/06 . Floating substructures as supports [{\(floating installations with arrangements acting by a sucking or forcing effect E02F 3/8833\)}](#)
- E02F 9/062 .. {Advancing equipment, e.g. spuds for floating dredgers}
- E02F 9/065 ... {characterised by the use of lines with anchors and winches}
- E02F 9/067 .. {with arrangements for heave compensation (for drilling structures [E21B 19/09](#); for lifting devices [B66C 13/02](#))}
- E02F 9/08 . Superstructures; Supports for superstructures [{\(arrangements for travelling gear, e.g. undercarriages for wheels, crawlers, caterpillars E02F 9/02; for motor vehicles B62D 25/00, B62D 33/00\)}](#)
- E02F 9/0808 .. { Improving mounting or assembling, e.g. frame elements, disposition of all the components on the superstructures (for disposition of specific components, [E02F 9/0858](#))}
- E02F 9/0816 ... { Welded frame structure}
- E02F 9/0825 ... { Cast frame structure}
- E02F 9/0833 .. { Improving access, e.g. for maintenance, steps for improving driver's access, handrails}
- E02F 9/0841 .. {Articulated frame, i.e. having at least one pivot point between two travelling gear units (tractor-trailer combinations [B62D 53/00](#))}
- E02F 9/085 .. { Ground-engaging fitting for supporting the machines while working, e.g. outriggers, legs (for vehicles in general [B60S 9/00](#), for cranes [B66C 23/78](#))}
- E02F 9/0858 .. { Arrangement of component parts installed on superstructures not otherwise provided for, e.g. electric components, fenders, air-conditioning units ([E02F 9/16](#), [E02F 9/18](#) take precedence)}
- E02F 9/0866 ... { Engine compartment, e.g. heat exchangers, exhaust filters, cooling devices, silencers, mufflers, position of hydraulic pumps in the engine compartment}
- E02F 9/0875 ... { Arrangement of valve arrangements on superstructures (arrangement of hydraulic hoses [E02F 9/2275](#) takes precedence; valves per se [E02F 9/2267](#))}
- E02F 9/0883 ... { Tanks, e.g. oil tank, urea tank, fuel tank (for vehicles in general [B60K15](#))}
- E02F 9/0891 ... { Lids or bonnets or doors or details thereof (doors for cabins [E02F 9/163](#) takes precedence; for motor vehicles [B62D 25/10](#))}
- E02F 9/10 .. Supports for movable superstructures mounted on travelling or walking gears or on other superstructures
- E02F 9/12 ... Slewing or traversing gears (roller and ball bearings [F16C](#))

- E02F 9/121 . . . . { Turntables, i.e. structure rotatable about 360?}
- E02F 9/123 . . . . . { Drives or control devices specially adapted therefor ([E02F 9/125](#) and [E02F 9/128](#) take precedence)}
- E02F 9/125 . . . . . { Locking devices}
- E02F 9/126 . . . . . { Lubrication systems}
- E02F 9/128 . . . . . { Braking systems}
- E02F 9/14 . . . Booms { only for booms with cable suspension arrangements (for booms or manipulators with cable suspensions for suction pipes [E02F 3/905](#) takes precedence; for booms per se [E02F 3/38](#); [E02F 3/34](#) for bucket-arms)}; Cable suspensions
- E02F 9/16 . . . Cabins, platforms, or the like, for drivers ({ for motor vehicles in general [B62D 33/06](#), for cranes [B66C 13/54](#))
- E02F 9/163 . . . { Structures to protect drivers, e.g. cabins, doors for cabins; Falling object protection structure (FOPS); Roll over protection structure (ROPS) (for handrails mounted on cabins [E02F 9/0833](#) takes precedence; for vehicles in general [B60R 21/11](#), [B60R 21/13](#), for fork-lift trucks [B66F 9/07545](#))}
- E02F 9/166 . . . { movable, tiltable or pivoting, e.g. movable seats, dampening arrangements of cabins (seats for vehicles in general [B60N2](#))}
- E02F 9/18 . . . Counterweights {(for cranes [B66C 23/72](#), for tractors [B62D 49/085](#))}
- E02F 9/20 . . . Drives; Control devices (gearings in general [F16H](#); controlling in general [G05](#); electric multi-motor drives [H02K](#), [H02P](#))
- E02F 9/2004 . . . {Control mechanisms, e.g. control levers (control levers per se [G05G](#))}
- E02F 9/2008 . . . { Control mechanisms in the form of the machine in the reduced scale model}
- E02F 9/2012 . . . { Setting the functions of the control levers, e.g. changing assigned functions among operations levers, setting functions dependent on the operator or seat orientation}
- E02F 9/2016 . . . { Winches (winches per se [B66D](#))}
- E02F 9/202 . . . { Mechanical transmission, e.g. clutches, gears (clutches per se [F16D](#), gears per se [F16H](#))}
- E02F 9/2025 . . . { Particular purposes of control systems not otherwise provided for ([E02F 3/16](#), [E02F 3/26](#), sub-groups of [E02F 3/43](#), [E02F 3/651](#), sub-groups of [E02F 3/84](#), [E02F 3/907](#), [E02F 5/145](#) take precedence)}
- E02F 9/2029 . . . { Controlling the position of implements in function of its load, e.g. modifying the attitude of implements in accordance to vehicle speed (control for hydraulic or pneumatic drives [E02F 9/2203](#), [E02F 9/2221](#) and [E02F 9/2253](#) take precedence)}
- E02F 9/2033 . . . { Limiting the movement of frames or implements, e.g. to avoid collision between implements and the cabin (sub-groups of [E02F 3/431](#) of [E02F 3/435](#) take precedence; for turntables [E02F 9/123](#))}
- E02F 9/2037 . . . {Coordinating the movements of the implement and of the frame}
- E02F 9/2041 . . . { Automatic repositioning of implements, i.e. memorising determined positions of the implement (for dipper-arms or bucket-arms [E02F 3/434](#), [E02F 3/437](#), [E02F 3/438](#), [E02F 3/439](#) take precedence)}
- E02F 9/2045 . . . { Guiding machines along a predetermined path (for graders [E02F 3/841](#); machines for construction of roads [E01C 19/004](#))}
- E02F 9/205 . . . { Remotely operated machines, e.g. unmanned vehicles ([E02F 3/8866](#) takes precedence)}

E02F 9/2054	...	{ Fleet management}
E02F 9/2058	..	{ Electric or electro-mechanical or mechanical control devices of vehicle sub-units (for vehicles in general B60W)}
E02F 9/2062	...	{ Control of propulsion units (for control of the prime mover depending on the load in a hydraulic or pneumatic drive <a href="#">E02F 9/2246</a> )}
E02F 9/2066	....	{ of the type combustion engines}
E02F 9/207	....	{ of the type electric propulsion units, e.g. electric motors or generators}
E02F 9/2075	....	{ of the hybrid type (for vehicles in general B60W20)}
E02F 9/2079	...	{ Control of mechanical transmission (for hydrostatic transmission or hydraulic torque converter <a href="#">E02F 9/2253</a> )}
E02F 9/2083	...	{ Control of vehicle braking systems}
E02F 9/2087	...	{ Control of vehicle steering (for steering with hydraulic or pneumatic drives <a href="#">E02F 9/225</a> )}
E02F 9/2091	...	{ Control of energy storage means for electrical energy, e.g. battery or capacitors (energy recovery arrangements in hydraulic or pneumatic drives <a href="#">E02F 9/2217</a> )}
E02F 9/2095	...	{ Control of electric, electro-mechanical or mechanical equipment not otherwise provided for, e.g. ventilators, electro-driven fans (control of hydraulic driven equipment <a href="#">E02F 9/22</a> )}
E02F 9/22	..	Hydraulic or pneumatic drives {(for dipper or bucket arm position control <a href="#">E02F 3/43</a> , for blade position control for graders <a href="#">E02F 3/844</a> ; for turntables <a href="#">E02F 9/121</a> ; for fork-lift trucks <a href="#">B66F 9/22</a> )}
E02F 9/2203	...	{ Arrangements for controlling the attitude of actuators, e.g. speed, floating function}
E02F 9/2207	....	{for reducing or compensating oscillations}
E02F 9/221	....	{for generating actuator vibration (buckets with vibrating means <a href="#">E02F 3/405</a> )}
E02F 9/2214	....	{for reducing the shock generated at the stroke end}
E02F 9/2217	...	{with energy recovery arrangements, e.g. using accumulators, flywheels}
E02F 9/2221	...	{ Control of flow rate; Load sensing arrangements ( <a href="#">E02F 9/2203</a> take precedence over <a href="#">E02F 9/2221</a> )}
E02F 9/2225	....	{using pressure-compensating valves}
E02F 9/2228	.....	{including an electronic controller}
E02F 9/2232	....	{using one or more variable displacement pumps}
E02F 9/2235	.....	{including an electronic controller}
E02F 9/2239	....	{using two or more pumps with cross-assistance}
E02F 9/2242	.....	{including an electronic controller}
E02F 9/2246	...	{ Control of prime movers, e.g. depending on the hydraulic load of work tools}
E02F 9/225	...	{Control of steering, e.g. for hydraulic motors driving the vehicle tracks (steering in general <a href="#">B62D</a> )}
E02F 9/2253	...	{ Controlling the travelling speed of vehicles, e.g. adjusting travelling speed according to implement loads, control of hydrostatic transmission}
E02F 9/2257	...	{Vehicle levelling or suspension systems (suspensions for vehicles in general <a href="#">B60G</a> )}
E02F 9/226	...	{ Safety arrangements, e.g. hydraulic driven fans, preventing cavitation, leakage, overheating}
E02F 9/2264	...	{ Arrangements or adaptations of elements for hydraulic drives}

- E02F 9/2267      ....      { Valves or distributors (position of valves arrangements on upper-structures [E02F 9/0875](#))}
- E02F 9/2271      ....      { Actuators and supports therefor and protection therefor}
- E02F 9/2275      ....      { Hoses and supports therefor and protection therefor}
- E02F 9/2278      ...        { Hydraulic circuits (not used)}
- E02F 9/2282      ....      { Systems using center bypass type changeover valves}
- E02F 9/2285      ....      { Pilot-operated systems}
- E02F 9/2289      ....      { Closed circuit}
- E02F 9/2292      ....      { Systems with two or more pumps}
- E02F 9/2296      ....      { Systems with a variable displacement pump}
  
- E02F 9/24        .      Safety devices {e.g. for preventing overload ([E02F 9/226](#) takes precedence)}
- E02F 9/245      ..      {for preventing damage to underground objects during excavation, e.g. indicating buried pipes or the like (detection of pipes in the ground [F16L 1/11](#))}
  
- E02F 9/26        .      Indicating devices {([E02F 5/145](#) takes precedence)}
- E02F 9/261      ..      { Surveying the work-site to be treated}
- E02F 9/262      ...      { with follow-up actions to control the work tool, e.g. controller}
- E02F 9/264      ..      { Sensors and their calibration for indicating the position of the work tool}
- E02F 9/265      ...      { with follow-up actions (e.g. control signals sent to actuate the work tool)}
- E02F 9/267      ..      { Diagnosing or detecting failure of vehicles}
- E02F 9/268      ...      { with failure correction follow-up actions}
  
- E02F 9/28        .      Small metalwork for digging elements, e.g. teeth { scraper bits (ploughs for agriculture [A01B 15/00](#); teeth of harrows [A01B 23/02](#))}
- E02F 9/2808      ..      {Teeth}
- E02F 9/2816      ...      {Mountings therefor}
- E02F 9/2825      ....      {using adapters}
- E02F 9/2833      ....      {Retaining means, e.g. pins}
- E02F 9/2841      .....     {resilient}
- E02F 9/285      ...      {characterised by the material used}
- E02F 9/2858      ...      {characterised by shape}
- E02F 9/2866      ..      { for rotating digging elements (for milling machines [B28D 1/186](#); for mining machines [E21C 35/18](#))}
- E02F 9/2875      ..      {Ripper tips}
- E02F 9/2883      ..      { Wear elements for buckets or implements in general}
- E02F 9/2891      ..      {Tools for assembling or disassembling}